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April 24, 2018

Ex Parte

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Use of Spectrum Bands Above 24 GHz for Mobile Radio Services
GN Docket No. 14-177

Dear Ms. Dortch:

On April 20, 2018, Gregory Romano, Philip Junker, and I of Verizon and Professor Daniel Vincent of the University of Maryland met with the attendees of the Commission listed in Attachment 1 to discuss AT&T's proposal to use a voucher auction to reallocate millimeter wave spectrum licenses to rationalize the band plan.[1] In the meeting we made clear that Verizon fully supports a fair and timely reorganization of the 39 GHz band. We do not believe, however, that an AT&T voucher auction would accomplish either goal. Instead the proposal would diminish the value of incumbent licenses and delay putting those spectrum licenses to early use for 5G to the benefit consumers.

During this meeting, and as detailed in Attachment 2, Dr. Vincent explained that an AT&T voucher auction would be difficult and time-consuming to implement. Vincent further disputed AT&T's claims that incumbent license holders in this band would not be harmed and generally could only be advantaged by the AT&T voucher auction proposal. Also, an AT&T voucher auction would raise serious legal questions regarding incumbent licenses in the 39 GHz band, particularly for Verizon, which invested billions of dollars to acquire this spectrum under the current rules.[2]

Rather than initiate a complex voucher auction as advocated by AT&T and disrupt and diminish incumbent licensee's rights, the Commission instead should encourage companies to voluntarily exchange licenses in advance of a 39 GHz auction. Licensees have every incentive to rationalize their holdings and move quickly to launch 5G in this band. American consumers would benefit more from voluntary exchanges that would allow licensees to quickly deploy rather than delaying use of the spectrum until after the development, initiation, and completion of a complex voucher auction. The

[1] Letter from Alex Starr, AT&T Services, Inc., to Marlene H. Dortch, FCC, GN Docket No. 14-177 (filed Dec. 12, 2017) ("AT&T Letter").
[2] *See* Letter from Gregory M. Romano, Verizon, to Marlene H. Dortch, FCC, GN Docket No. 14-177 (filed Jan. 25, 2018).

Commission endorsed this approach in the *Spectrum Frontiers Order*,[3] which helped inform subsequent business decisions (including Verizon's decision to acquire Straight Path).

The Commission should give this market-based approach an opportunity to work and should do all it can to encourage incumbent licensees to negotiate license swap transactions that would reorganize and rationalize the 39 GHz band as soon as possible.

Sincerely,

Attachments

[3] *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*; *et al.*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014, ¶¶ 97-100 (2016).

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Attachment 1

Wireless Telecommunications Bureau
Simon Banyai
Erik Salovaara (via tele-conference)
John Schauble
Martha Stancill
Blaise Scinto
Dana Shaffer (via tele-conference)
Donald Stockdale
Joel Taubenblatt
Jennifer Tomchin (via tele-conference)
Margaret Wiener

Office of Strategic Planning and Policy Analysis
Evan Kwerel
Paul LaFontaine

Office of General Counsel
David Horowitz (via tele-conference)
Douglas Klein

Attachment 2

Complexities of an AT&T Voucher Auction

By Daniel R. Vincent

Prepared for Verizon

April 24, 2018

Introduction.

My name is Daniel R. Vincent. I am Professor of Economics at the University of Maryland, College Park where I teach graduate courses in microeconomic theory and industrial organization. I am an economic theorist with a specialization in auction theory and market design. I have published scholarly articles in this area in top economic journals and in policy forums. I served as advisor to the FCC in their evaluation of the performance of the initial major SMR auctions for PCS licenses. I was a member of an outside consulting team (Market Design Incorporated) that provided early models of combinatorial auctions for spectrum. Additionally, I have advised the FCC and Industry Canada, as well as other government agencies on the design of spectrum auctions. I have also provided advice to bidders participating in such auctions. I have served as consultant for the US Department of Justice Antitrust Division and for a variety of third parties on antitrust matters.

Verizon asked me to discuss with members of the staff at the Federal Communications Commission issues and problems relating to a proposed auction mechanism presented to the Commission by James Bono and Allan Ingraham on behalf of AT&T.[1]

Executive Summary

The proposed voucher auction can harm incumbent license holders because structural problems with the mechanism imply a strong possibility that the auction will not operate smoothly or efficiently. Incumbents can also be harmed because the proposal may impose a strictly worse outcome on the license holder compared to its original holdings.

- Structural problems:
    - Strategic incentives: The inclusion of voucher holders in the bidding process implies that some bidders in the proposed mechanism who may prefer higher prices than their actual valuation of the license. This reduces their incentives to bid sincerely and impedes the ability of the mechanism to generate an efficient allocation of licenses.
    - Complexity: The inclusion of encumbered or partial licenses in the auction either increases the complexity of the first phase (if the licenses are not sold as generic licenses) or the complexity of the assignment phase (if the licenses are sold as generic licenses in the first phase and then must be allocated appropriately in the second phase). This increase in complexity imposes a burden on all participants in the auction including incumbents.
- Forced outcomes:
    - Payment for placement: If all bidders strictly prefer positions in the band other than the default placement that is proposed, then incumbents that wish to maintain their current holdings and placement would have to compete with rival bidders in

[1] James Bono and Allan Ingraham, "An Auction Design for Millimeter Wave Spectrum", November, 30, 2017. Attachment to an Ex Parte letter from AT&T, December 12, 2017.

the assignment phase in order not to be placed at a disadvantageous part of the spectrum.

- Non-linear valuations: If incumbent license holders who currently own less than 200MHz of spectrum do not place additional value on 200MHz block compared to their initial holdings, the proposed compensation scheme will often result in compensating them for less than their valuation on their holdings if they give up the spectrum or force them to bid more for the spectrum than they value it.
- Under-compensation with Undersell: In the event that licenses in a PEA are not all sold ("undersell"), the proposed mechanism would require incumbents to accept something lower than the full license price which may also be lower than their initial valuation for their spectrum holdings.

Problems With Voucher Auctions

Outline

For markets to function properly, it is important that property rights be well-defined and reliably protected. This applies both to auction markets, such as the FCC spectrum auctions, and to spontaneously formed markets, such as secondary markets for spectrum. If a potential buyer perceives that some of the property rights embedded in a contemplated purchase are tenuous, the buyer would rationally shy away from the transaction. In various presentations of the voucher auction for spectrum in the 39 GHz band width proposed by AT&T, claims were presented suggesting that incumbent license holders in this band would not be harmed and generally could only be advantaged by the mechanism.[2] This assertion is not true, in general.

Scenarios in which incumbents (and perhaps other participants) will be harmed come under at least two separate types of issues: The first type involves structural problems with the mechanism itself that weaken confidence that the mechanism would work smoothly or that it would ensure an efficient allocation of licenses; The second type involves plausible conditions under which an incumbent license holder can be explicitly harmed should the voucher auction be implemented as proposed.

Voucher Auction Weaknesses

Structural Problems

Strategic Issues

Auctions are often promoted as mechanisms that encourage sincere behavior by participants which tend to result in efficient allocations of scarce resources. This confidence is justified in many cases because competitive pressures on bidders -- all of whom are on the same side of the market

[2] "The purpose of the voucher system is to promote the efficient use of millimeter wave spectrum while respecting incumbent license holdings and creating a level playing field for incumbents and new entrants alike.", (Bono and Ingraham, p. 3.) "Accordingly, while the auction would afford incumbents the opportunity to improve their spectrum holdings, it would not disadvantage them in any way." (AT&T Ex Parte 3/22/18).

-- limit their ability to engage in strategic behavior. Such a scenario will not arise in the case of a voucher auction.

By allowing incumbents with an opposite interest in final auction prices to bid in the auction, the proposal creates an incentive for these bidders to bid *above* their true value in order to increase the potential price they would be paid if they did not acquire their original spectrum. This feature may be exacerbated by the fact that there could be multiple bidders acting this manner and by the fact that these bidders also will be bidding on licenses that potentially serve as substitutes for the license vouchers they hold going into the auction. This countervailing incentive makes it difficult to ensure that the outcome of the auction is efficient. Additionally, it has the tendency to result in higher spectrum prices than would be expected to arise if incumbents with vouchers did not bid in the auction.

The Bono/Ingraham paper refers to this issue in passing, however, in my view the "fix" they propose -- that is, allowing limited withdrawals -- would not be very effective in eliminating incentives for this behavior. In contrast, an earlier paper cited in the Bono/Ingraham paper by Evan Kwerel and John Williams[3] devotes a number of pages to describing this issue and they offer tentative solutions, before concluding "Further study of the best design of a simultaneous exchange mechanism is necessary."

Complexity

Depending on how important the overlap from the RSAs are and how many hold-out licensees there are, the selling of encumbered licenses will generate additional complexities in a variety of ways: i) If multiple, non-generic licenses are sold in the first-stage, then the simplicity of the clock auction process is lost. ii) If, instead, the encumbered licenses are sold as if generic with unencumbered licenses, bidding in the assignment phase will become much more important and bidders who bid in the clock auction phase will have a more challenging problem determining what to bid as they must anticipate what might occur in the second phase. In either case, the operation of the actual auction will pose challenging problems for participants that will hinder its ability to efficiently allocate spectrum.

Harm To Incumbents

In this analysis, for clarity, I assume away the issues raised in the earlier section. It is also maintained throughout that one of the following two conditions hold: An incumbent license holder strictly prefers to be located somewhere other than at the top of the band plan (the default location for an incumbent that chooses not to give up its license for auction); and/or that an incumbent license holder wishes to acquire additional spectrum offered in the voucher auction (were an incumbent to choose not to yield a license, under the proposal, it would no longer be allowed to participate in the license auction.

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[3] Evan Kwerel and John Williams, "A Proposal for Rapid Transition to a Market Allocation of Spectrum", November, 2002, OPP Working Paper 38.

Paying for placement

Consider an incumbent with 200MHZ of license which wishes to maintain its license. If it does not care where it is placed, then it can always give up its license, bid up to any price *p* for the license in the first stage, acquire that license for free by paying *p* and receiving a credit of *p* and bidding zero in the assignment phase. However, suppose that all bidders place a premium of, say, $0.5M, on not being placed on the top of the band (and suppose that the incumbent's current holdings are not initially at the top of the band, say three blocks down from the top). In order to keep from being placed at the least desired part of the band, the incumbent would have to bid in the second stage auction at a price of $0.5M simply in order to keep its current preferred holdings. The proposal would compensate the licensee for the first phase license price but not for the second phase cost of keeping its preferred holdings in the spectrum.

Nonlinear Spectrum Valuations

Consider an incumbent with 100 MHZ of spectrum such that it values the spectrum at $1M but it places no additional value on holding 200MHZ of spectrum instead. Specifically, this incumbent is willing to pay $1M for a license whether or not the license is 100MHZ or 200MHZ. Under the proposal, for any first phase auction price, *p,* the incumbent would typically be compensated *p/2* for its holdings. In this scenario, if the incumbent bid its value for the 200 MHZ block, it would bid $1M. If that bid determined the price, the incumbent would only be compensated $1M* ½ = $.5M which is much less than its original value for the license. Alternatively, it could bid higher than $1M in order to raise the auction price, however, in doing so, it risks being required to pay more for the new block than it is worth to the incumbent.

Compensation With Undersell

Suppose there is a single incumbent which gives up 200MHZ of spectrum and the clock auction proceeds to try to sell 12 blocks with a required minimum bid of *$R.* Suppose further, that the incumbent bidder with value for its license *V< R* chooses (rationally) not to bid. If *D < 12* licenses are sold, since there is undersell (supply exceeds demand) we can expect that the first phase auction price will be the initial price, *$R,* and total revenue raised will be $*D*R.* Under the proposal[4], the incumbent will receive *$R*D/12* in compensation for its license rather than *$R*. This could end up being much less than its actual value. For example, suppose *R=$1M* and *D=6* while the incumbent's value is $*.9M.* In this case, the payment to the incumbent for the license that it gave up would be *$.5M* which is much less than its original value for the license.

[4] The Bono/Ingraham paper is somewhat unclear about how the share is calculated. My interpretation is that if $D*R is the revenue raised, the incumbent gains v/12 of that revenue, which in this case is 1/12 and the FCC gets (12-v)/12 of the revenue.